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## REMARKS

By this amendment, claims 1, 5, 8, 10, 11, 14 and 16 have been amended to overcome the Examiner's objections as to form and/or to better define Applicant's invention. Claims 4 and 13 have been cancelled, and new claims 18-26 have been added. The provisional allowability of claims 8 and 9 is noted.

Claims 1-3, 5-7, 10-12 and 14 stand rejected under U.S.C. §103(a) over Baker et al. (cited by Applicant), and further in view of Rohr (also cited by Applicant). Given that limitations of claim 4 have been moved into claim 1 and claim 1 has been cancelled, only the rejection of independent claim 11and the claims which depend therefrom will be addressed at this time.

Baker resides in a capacitive joystick apparatus operative to detect user movements in an x,y plane, as well as rotational motion through a mechanical assembly 305 (see Figures 4-7 and Baker et al. at column 3, line 45 to column 4, line 3). To detect x-y movements, four spring-biased plunger assemblies are used. With respect to the z-axis, however, Baker et al. utilize a nautilus-shaped electrically conductive element 340 rotationally displaced relative to a fixed half-circle-shaped electrically conductive element 360 with a stationary dielectric 350 therebetween.

Rohr, on the other hand, being directed to a shaft rotation sensor, utilizes a butterfly-shaped dielectric member 14 which is fixedly attached to a rotatable shaft 10 and positioned between plate members 12 and 13.

The Examiner contends that it would have been obvious to utilize Rohr's teachings and the joystick device of Baker "because this would produces [sic] a capacitor joystick having a better linearity and being insensitive to radial motions of the rotary shaft, thereby obtaining high precision measurement applications, as taught by Rohr ...". Applicant respectfully disagrees on several grounds. First, it is well settled that "[o]bviousness may not be established using hindsight or in view of the teachings or suggestions of the invention." Para-Ordnance Mfg. Inc. v. SGS Importers Int'l Inc., 73 F.2d at 1087, 37 USPQ2d at 1239 (citing W.L. Gore & Assoc., Inc. v. Garlock Inc., 721 F.2d at 1551, 1553, 220 USPQ at 311, 312-313). In rejecting claims under 35 U.S.C. §103, the Examiner must provide a reason why one having ordinary skill in the pertinent art would have been led to combine references to arrive at Applicant's claimed invention. There must be something *in the prior art* that suggests the proposed modification, other than the hindsight gained from knowledge that the inventor

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choose to combine these particular things in this particular way. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988). The Examiner is further required to make specific findings on a suggestion to combine prior art references. In Re Dembeczak, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999).

In this case, with respect to *rotation*, the electrode arrangement of Baker et al. is entirely satisfactory, and there is no hint or suggestion of the problems foreseen by the Examiner which the combination of Rohr to Rohr would purportedly solve. That is, given the shaped electrodes of Baker et al., one of ordinary skill in the art would conclude that linearity and sensitivity to radial motions of the Baker et al. joystick would be acceptable, such that the addition of Rohr would be unnecessary, but for the hindsight gained through Applicant's invention.

In addition, even if the Baker et al./Rohr combination were justified, Applicant's invention as claimed would not result. In particular, by moving certain of the limitations of 13 into 11, it should be further apparent that manipulation of Applicant's device causes the dielectric element to laterally shift in a plane parallel to the fixed electrodes, which is not the case under the teachings of Baker et al. or Rohr. Accordingly, *prima facie* obviousness is expressly precluded.

Although it is believed that the relevant claims dependent upon claim 11 are allowable as well, Applicant further takes issue with some of the conclusions drawn by the Examiner, namely, that "the dielectric element 14" of Rohr is a circular disc. See Office Action, bottom of page 7. This is certainly not the case. The dielectric element of Rohr is in all cases a symmetrical butterfly shape, intentionally configured to produce a cancellation affect compatible with the teachings of Rohr.

Claims 1-4, 6, 7, 10-13 and 15-17 stand rejected under U.S.C. §103(a) over Zimmerman et al. (U.S. Patent No. 6,184,865), and further in view of Rohr. Zimmerman resides in a user-manipulable input device that includes an electrically conductive articulating member and a plurality of stationary, electrically conductive sensors. The physical disposition of the articulating member and the sensors provides narrow gaps, across which are measurable capacitances. The articulating member is preferably a cone-shaped member, having a conductive surface which faces the sensors. The user manipulates the articulating member by a swinging the member in a pendulum-like fashion, causing the capacitances to change in value. The articulating member is preferably a cone-shaped member, having a conductive surface which faces the sensors.

Again the Examiner contends that it would have been obvious to utilize Rohr's teachings and the joystick device of Zimmerman "because this would produces [sic] a capacitor joystick having a better linearity and being insensitive to radial motions of the rotary shaft, thereby obtaining high precision measurement applications, as taught by Rohr ...". But as in the case of Baker et al. and Rohr, there is no teaching or suggestion from the prior art in support of this combination, and again, even of the combination were justified, Applicant's invention would not result. Both independent claims 1 and 11 clarify that translation of a dielectric element occurs in a plane. As neither Zimmerman nor Rohr disclose or suggest such an arrangement, obviousness is precluded.

Based upon the foregoing amendments and comments, Applicant believes all claims are in condition for allowance. Questions regarding this application can be directed to the undersigned attorney at the telephone/facsimile numbers provided.

Attached is a version showing the changes made to the amended claims.

Respectfully submitted,

By: _____

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

*Replace the paragraph on page 13, lines 3-14 with the following:*

Figure [5A] 5 is a drawing which illustrates the applicability of the invention to a joystick including a z-axis control capability. [Figure 5B is a side view in partial cross section of the device of Figure 5A.] The non-directional lever has been replaced with a rotational control, preferably including a knob 502 and a shaft pin 504 coupled to an asymmetric disk 510. The disk 510 includes a keyed hole 512 in registration with the shaft pin 504; otherwise, the transmitting and detector plates 514, 516, including respective metallization patterns 518, 520, are similar if not identical to the plates in the non-Z-axis version described above. The use is again preferably housed in a plastic base 522, through which a joystick type lever 503 protrudes. A spring 530, spring seat 532 and retaining clip 534 are preferably used to keep the lever 503 with knob attached thereto biased upwardly for fine control. Related electronics 540 (not shown) are again preferably located on the lower PCB 514.

IN THE CLAIMS:

1. (Amended) A capacitive position sensor configured for interconnection to a utilization device, comprising:

a stationary signal-detecting capacitor plate;

a stationary signal-transmitting capacitor plate supported parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a plurality of electrically separated segments;

a dielectric element disposed between the signal detecting and signal-transmitting capacitor plates;

an elongate member having a user-manipulable proximal end and a distal end coupled to the dielectric element, the member being operative to [move] laterally shift the element in the x or y directions in a plane substantially parallel to the stationary plates as a function of user position;

circuitry in electrical communication with the stationary plates, the circuitry being operative to (a) measure the capacitance between each segment of the signal-transmitting plate and the signal-

detecting plate, and (b) determine user position in the x or y directions as a function of the measured capacitance; and

an output for communicating the user position to the utilization device.

5. (Amended) The position sensor according to claim 1, wherein [movement of the elongate m ember causes] the dielectric element is non-circular, enabling the circuitry to determine user rotation of the elongate member with or [rotate within the plane] without laterally shifting of the dielectric element [translation].

8. (Amended) The position sensor according to claim 1, further comprising:

a pair of assemblies, each including a stationary signal-detecting capacitor plate,

a stationary segmented signal-transmitting capacitor plate, a dielectric element disposed between the plates, and an elongate member rotationally coupled to the dielectric element; and

wherein the elongate members are supported at right angles to one another to measure [the] movement [of a user] in x and y dimensions.

10. (Amended) A method of sensing position, comprising the steps of:

providing [a] the position sensor according to claim 1[,] and placing the signal-detecting plate at a known electrical potential, then:

a) placing one of the signal-transmitting plates at a first electrical potential;

b) changing the potential on the signal-transmitting plate to second known potential;

c) measuring and storing the capacitance between the signal-transmitting plate and the signal-detecting plate;

d) repeating steps a) through c) for each segment of the signal-transmitting plate; and

e) determining the position of the dielectric element and elongate member as a function of the stored capacitance measurements.

11. (Amended) A capacitive-based joystick configured for interconnection to a utilization device, comprising:

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a housing having a top surface;

a stationary signal-detecting capacitor plate disposed within the housing;

a stationary signal-transmitting capacitor plate disposed within the housing parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a plurality of electrically separated segments;

a dielectric element disposed within the housing between the signal-detecting and signal-transmitting capacitor plates;

a joystick lever supported for pivotal movement having a proximal end for user engagement and a distal end which extends through the top surface of the housing and at least one of the signal-detecting and signal-transmitting capacitor plates, enabling the [level] lever to [move] laterally shift the dielectric element in x and y directions in a plane substantially parallel to the stationary plates as a function of user position;

circuitry in electrical communication with the stationary plates, the circuitry being operative to (a) measure the capacitance between each segment of the signal-transmitting plate and the signal-detecting plate, and (b) determine user position as a function of the measured capacitance; and

an output for communicating the user position to the utilization device.

14. (Amended) The joystick according to claim 11, wherein the dielectric element is non-circular, enabling the circuitry to determine user rotation of the lever with or without laterally shifting of [movement of the lever causes] the dielectric element [to rotate within the plane without translation].

16. (Amended) The joystick according to claim 11, [including] wherein the plurality of electrically separated segment includes 3 or 4 arcuate segments.

~~Approved~~
JHN
03/25/03

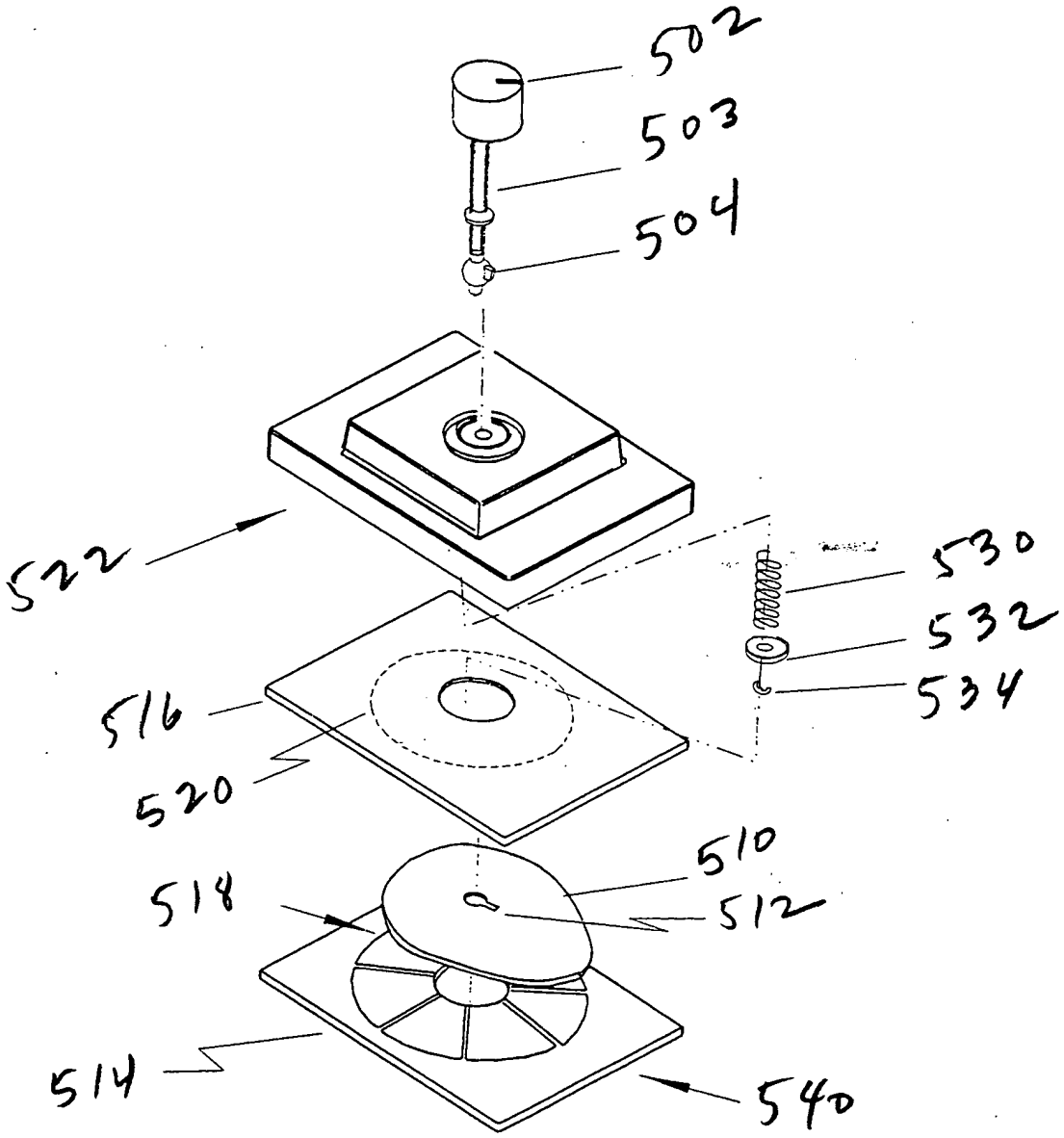


Fig-~~5A~~ 5